

12 **EUROPEAN PATENT APPLICATION**

21 Application number: 81301131.9

51 Int. Cl.³: **B 62 M 3/00**

22 Date of filing: 18.03.81

30 Priority: 25.03.80 JP 40045/80 U

71 Applicant: **SHIMANO INDUSTRIAL COMPANY LIMITED**,
77, 3-cho Oimatsu-cho Sakai-shi, Osaka (JP)

43 Date of publication of application: 30.09.81
Bulletin 81/39

72 Inventor: **Shimano, Keizo**, 81, 3-cho,
Midorigaoka-minamimachi Sakai-shi, Osaka (JP)

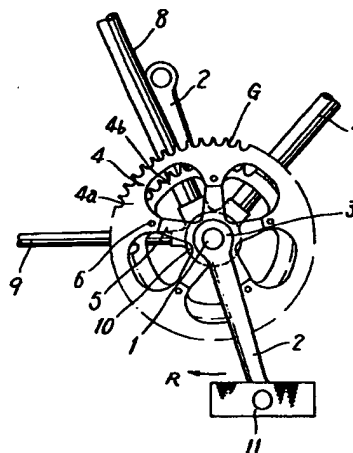
84 Designated Contracting States: **BE DE FR GB IT**

74 Representative: **Szczuka, Jan Tymoteusz et al**,
Cruikshank & Fairweather 19 Royal Exchange Square,
Glasgow G1 3AE Scotland (GB)

54 **Cycle drive crank.**

57 This invention relates to a cycle drive crank means comprising a crank having a crank shaft (1) and a pair of crank arms (2), and at least one chain wheel (4) secured to said crank. Known such crank means have crank arms which are generally rectangular in cross-section and generate appreciable wind resistance forces which require a greater effort by the rider.

According to this invention each of said crank arms (2) has, in cross-section, a rounded leading side (2a) with respect to the direction of rotation (R) of said crank for driving of the cycle, and two lateral sides (2b, 2d) extending rearwardly from said leading side (2a) and converging inwardly towards each other in a direction towards the trailing side (2a) of said crank arm (2).



CYCLE DRIVE CRANK

This invention relates to a cycle drive crank means, comprising a crank having a crank shaft and a pair of crank arms, and at least one chain wheel secured to said crank.

5 In use of such crank means with pedals mounted on the distal ends of the crank arms, a rider treads on the pedals to turn the crank arms about the crank shaft to drive the cycle via a drive chain. Conventionally the crank arms are generally rectangular in cross-section, so
10 that when the cycle is ridden at high speed, the rider has to turn the crank arms against an increased air resistance. As a result the rider becomes tired more quickly due to reduced high speed running efficiency of the cycle.

Cycles used for touring or racing are preferably
15 made to be ridden at high speed in a stable condition with the minimum possible air resistance in order to minimize tiring of the rider. However, the abovementioned conventional type of crank arm with its rectangular cross-section, tends to generate a relatively large air resistance as the
20 leading surface of the crank arm drives through the air flow around the cycle and stagnant zones or eddy currents are generated at the trailing sides of the crank arms.

It is an object of the present invention to avoid or minimize one or more of the above disadvantages.

25 The present invention provides a cycle drive crank means comprising a crank having a crank shaft and a pair of crank arms, and at least one chain wheel secured to said crank characterized in that
30 each of said crank arms has, in cross-section, a rounded leading side with respect to the direction of rotation of said crank means for driving of the cycle, and two

lateral sides extending rearwardly from said leading side and converging inwardly towards each other in a direction towards the trailing side of said crank arm.

5 With previously known crank arms air resistance is generated as an air flow strikes the leading surface of the crank arm substantially perpendicularly and then passes along both lateral sides of the same, and is further increased by stagnant zones or eddy currents being generated at the trailing side of the crank arms.

10 With crank arms of the present invention, however, the air flow passes smoothly around the crank arms so that the crank arms meet with only substantially reduced air resistance. As a result, the rider can drive the cycle at high speed in a stable condition with less
15 tiring.

Further preferred features and advantages of the invention will appear from the following description given by way of a preferred embodiment illustrated with reference to the accompanying drawings, in which:

20 Fig. 1 is a side view of a crank means of the invention mounted on a cycle; and

Fig. 2 is a cross-sectional view of a crank arm of the crank means on an enlarged scale.

Fig. 1 shows a cycle drive crank means G of the
25 invention comprising a crank 3 having a crank shaft 1 and a pair of crank arms 2 mounted at opposite axial ends of said crank shaft 1, and at least one chain wheel 4 secured thereto for rotation therewith. In more detail Fig. 1 shows a larger diameter chain wheel 4a and a smaller
30 diameter chain wheel 4b mounted on an adapter 5 with the aid of fastening means, such as nuts and bolts 6, the adapter 5 being integrally formed with one crank arm 2 at the axially inward (relative to the crank shaft) side.

The crank shaft 1 is rotatably mounted in a bottom bracket 10 connecting a down tube 7, seat tube 8 and chain stay 9 of the cycle frame. Pedals 11 are mounted at the distal ends of the crank arms 2 for treading by a rider to turn the crank arms in the direction of the arrow R shown in Fig. 1, thereby driving the cycle forwards via the usual transmission means comprising a drive chain, sprocket etc. (not shown).

Each crank arm 2 is, as shown in Fig. 2, made arcuate in cross-section at its leading side 2a with respect to direction of turning of the crank arm 2 for driving of the cycle. Both lateral sides extending from said leading side 2a converge inwardly towards each other in the direction towards the trailing side 2c of the crank arm, and the trailing side is also arcuate in cross-section but with a smaller radius of curvature than the leading side 2a.

Naturally, the cycle drive crank means G could instead have only one chain wheel. Also the chain wheel(s) 4a could be secured directly to the crank arm 2 by caulking or other methods. Moreover the crank shaft 1 could be formed integrally with one or both of the crank arms 2.

With the above cycle drive crank means G a rider treads the pedals 11 to turn the crank arms 2 and hence the chain wheels 4a, 4b to drive the cycle.

As the cycle moves forward the air flow at the rounded leading side 2a of each crank arm 2 passes smoothly along the lateral sides 2b of the crank arm 2 so that each crank arm 2 is subjected to a substantially reduced air resistance due to the above described cross-sectional configuration. Also, the rounded trailing side 2c of the crank arm 2 results in a smoother air flow around the rounded trailing side 2c substantially avoiding the generation of eddy currents thereby further reducing air resistance.

CLAIMS

1. A cycle drive crank means comprising a crank having a crank shaft (1) and a pair of crank arms (2), and at least one chain wheel (4) secured to said crank characterized in that
5 each of said crank arms (2) has, in cross-section, a rounded leading side (2a) with respect to the direction of rotation (R) of said crank means for driving of the cycle, and two lateral sides (2b, 2d) extending rearwardly from said leading side (2a) and converging inwardly towards each
10 other in a direction towards the trailing side (2a) of said crank arm (2).
2. A cycle drive crank means according to Claim 1, wherein each of said crank arms (2) has, in cross-section, a rounded trailing side (2a) which trailing side has a
15 smaller radius of curvature than said rounded leading side (2a).
3. A cycle drive crank means according to Claim 1 or Claim 2 wherein the lateral sides (2b, 2d) of the crank arms (2) are substantially flat.
- 20 4. A cycle drive crank means according to any one of Claims 1 to 3 wherein the rounded sides (2a, 2c) are part-circular.



FIG. 1

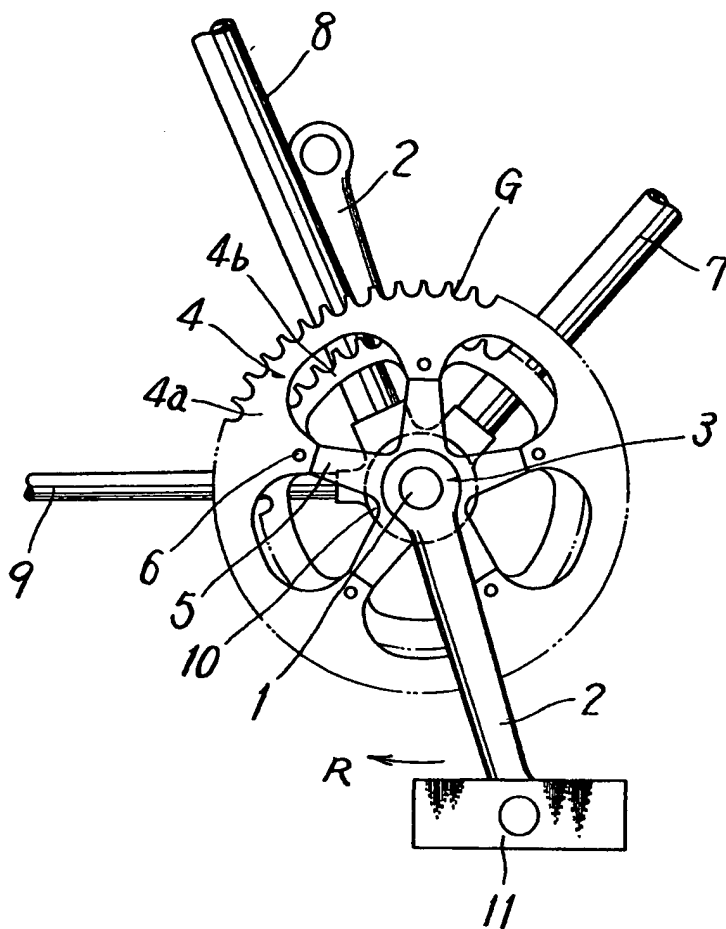
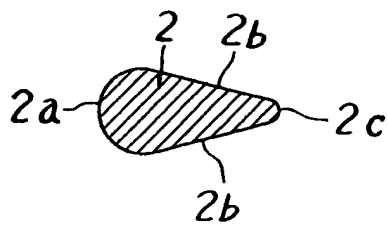


FIG. 2





European Patent
Office

EUROPEAN SEARCH REPORT

0036750
Application number
EP 81 30 1131

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | CLASSIFICATION OF THE APPLICATION (Int. Cl.) |
|--|---|-------------------|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | |
| A | <u>DE - A - 1 505 958</u> (THUN) * figure 1 * --- | 1 | B 62 M 3/00 |
| A | <u>FR - A - 2 185 997</u> (LANNEMAJOU) * figure 1 * --- | 1 | |
| A | <u>BE - A - 677 542</u> (THUN) * figure 6 * --- | 1 | |
| A | <u>FR - A - 2 416 829</u> (GAUTHIER) * figures * ----- | 1 | |
| | | | TECHNICAL FIELDS SEARCHED (Int. Cl.) |
| | | | B 62 M |
| | | | CATEGORY OF CITED DOCUMENTS |
| | | | X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons |
| | | | &: member of the same patent family, corresponding document |
| The present search report has been drawn up for all claims | | | |
| Place of search | Date of completion of the search | Examiner | |
| The Hague | 17-06-1981 | SCHMITTER | |